IN THE CLAIMS

1. (Previously Presented) A method for etching a semiconductor device to form an etched pattern therein, comprising:

(a) providing an unetched semiconductor device having a plurality of layers, at least one of the layers of the semiconductor device comprising a refractory metal-containing material; and

(b) etching the unetched semiconductor device with a first etchant chemistry which comprises a chlorine source free of BCl_3 and a fluorine source, followed with a second etchant chemistry which is free of fluorine.

2. (Original) The method of Claim 1, wherein the refractory metal-containing material is selected from the group consisting of refractory metals, refractory metal alloys and refractory metal silicides.

3. (Original) The method of Claim 2, wherein the refractory metal-containing material comprises a refractory metal selected from the group consisting of molybdenum, titanium and tungsten or a refractory metal silicide selected from the group consisting of tungsten silicide and molybdenum silicide.

4. (Original) The method of Claim 2, wherein the refractory metal-containing material comprises TiW alloy.

5. (Original) The method of Claim 1, wherein the first etchant chemistry comprises a chlorine source and a fluorine source.

6. (Original) The method of Claim 5, wherein the chlorine source is selected from the group consisting of CI_2, HCI and CCI_4.

7. (Original) The method of Claim 5, wherein the fluorine source is selected from the group consisting of SF_6, F_2, NF_3 and CF_4.

8. (Original) The method of Claim 5, wherein the first etchant chemistry has a chlorine concentration of about 50 percent to about 95 percent.

9. (Original) The method of Claim 5, wherein the first etchant chemistry further comprises N_2.

10. (Original) The method of Claim 1, wherein the second etchant chemistry comprises a chlorine source.

11. (Original) The method of Claim 10, wherein the chlorine source is selected from the group consisting of CI_2, HCI and CCI_4.

12. (Original) The method of Claim 10, wherein the second etchant chemistry has a chlorine concentration of about 50 percent to about 95 percent.

13. (Original) The method of Claim 1, wherein the conditions include a source power of from about 100 watts to about 450 watts and a bias power of from about 200 watts to about 500 watts.

14. (Original) The method of Claim 13, wherein the ratio of the bias power to the source power is about 0.5:5.

15. (Currently Amended) A method of etching a refractory metal-containing layer and an oxide layer, the method comprising:

(a) etching the refractory metal-containing layer to an end point using a first etchant chemistry at a source power of from about 100 watts to about 450 watts and a bias power of from about 200 watts to about 500 watts, wherein the first etchant chemistry comprises a chlorine source free of BCl_3 and a fluorine source; and

(b) etching partially through the oxide layer using a second etchant chemistry, wherein the second etchant chemistry comprises a chlorine source, and contains no fluorine.

16. (Original) The method of Claim 15, wherein the refractory metal-containing layer is disposed above the oxide layer.

17. (Original) The method of Claim 15, wherein the refractory metal-containing layer comprises a material selected from the group consisting of refractory metals, refractory metal alloys and refractory metal silicides.

18. (Original) The method of Claim 17, wherein the refractory metal-containing material comprises a refractory metal selected from the group consisting of molybdenum, titanium and tungsten or a refractory metal silicide selected from the group consisting of tungsten silicide and molybdenum silicide.

19. (Original) The method of Claim 17, wherein the refractory metal-containing material comprises TiW alloy.

20. (Original) The method of Claim 15, wherein the chlorine source of the first etchant chemistry is selected from the group consisting of CI_2, HCI and CCI_4.

21. (Original) The method of Claim 15, wherein the fluorine source of the first etchant chemistry is selected from the group consisting of SF_6, F_2, NF_3 and CF_4.

22. (Original) The method of Claim 15, wherein the first etchant chemistry has a chlorine concentration of about 50 percent to about 95 percent.

23. (Original) The method of Claim 15, wherein the first etchant chemistry further comprises N_2.

24. (Original) The method of Claim 15, wherein the chlorine source of the second etchant chemistry is selected from the group consisting of CI_2, HCI and CCI_4.

25. (Original) The method of Claim 15, wherein the second etchant chemistry has a chlorine concentration of about 50 percent to about 95 percent.

26. (Original) The method of Claim 15, wherein the second etchant chemistry further comprises N_2.

27. (Original) The method of Claim 15, wherein the first etchant chemistry comprises about 45 sccm of CI_2, about 30 sccm of SF_6 and about 5 sccm of N_2.

28. (Original) The method of Claim 15, wherein the second etchant chemistry comprises about 45 sccm of CI_2 and about 15 sccm of N_2.

29. (Original) The method of Claim 15, wherein the source power is from about 125 watts to about 210 watts and the bias power is from 225 watts to about 310 watts.

30. (Original) The method of Claim 15, wherein the ratio of the bias power to the source power is about 0.5:5.

31. (Previously Presented) A method of etching a semiconductor device using a capacitive coupling plasma reactor to form a pattern on the semiconductor device, comprising:

(a) providing a semiconductor device having a plurality of layers, at least one of the layers of the semiconductor device comprising a refractory metal-containing material; and

(b) etching the semiconductor device at a bias power of from about 100 watts to about 750 watts, with a first etchant chemistry comprising chlorine free of BCl_3 and a fluorine source, followed with a second etchant chemistry free of fluorine.

32. (Original) The method of Claim 27, wherein the bias power is from about 250 watts to about 350 watts.

33. (Original) A method of etching a refractory metal-containing layer and an oxide layer, the method comprising:

(a) etching the refractory metal-containing layer to an end point using a first etchant chemistry at a bias power of from about 100 watts to about 750 watts, wherein the first etchant chemistry comprises a chlorine source and a fluorine source; and

(b) etching partially through the oxide layer using a second etchant chemistry, wherein the second etchant chemistry comprises a chlorine source.

34. (Original) The method of Claim 33, wherein the bias power is from about 250 watts to about 350 watts.

35. (Original) The method of Claim 1, wherein said refractory metal-containing layer is etched at a source power of from about 100 watts to about 450 watts and a bias power of from about 200 watts to about 500 watts.